SEQUENCE LISTING

<110> Wagstaff, Glenn
Schmollinger, Jan
Hodi, F. Stephen
Mollick, Joseph

<120> TUMOR ANTIGENS AND USES THEREOF

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<141> 2002-08-29

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<151> 1998-08-07

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65                  70                  75                  80
Trp Arg Ala Thr Arg Asp Met Cys Arg Tyr Arg His Asn Tyr Pro Asp
                85                  90                  95
Leu Val Glu Arg Asp Cys Asn Gly Asp Thr Pro Asn Leu Ser Phe Tyr
            100                 105                 110
Arg Asn Glu Ile Arg Phe Leu Pro Asn Gly Cys Phe Ile Glu Asp Ile
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Leu Gln Asn Trp Thr Asp Asn Tyr Asp Leu Leu Glu Asp Asn His Ser
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Tyr Ile Gln Trp Leu Phe Pro Leu Arg Glu Pro Gly Val Asn Trp His
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Ala Lys Pro Leu Thr Leu Arg Glu Val Glu Val Phe Lys Ser Ser Gln
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Tyr Gly Ile Arg Leu Glu Asp Arg Gly Thr Gly Thr Val Gly Arg Ala
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225                 230                 235                 240
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                245                 250                 255
Val Arg Arg Glu Leu Pro Gly Val Arg Gln Ser Ala Leu Asp Tyr Phe
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His Arg Arg Pro Gln Ala Pro Ala Gln Gln Asp Leu Gln Gly Thr Ser
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Gln Pro Arg Ala His Arg Arg Pro Gln Ala Pro Ala Gln Gln Asp Leu
65   70   75   80
Gln Gly Thr Ser Arg Pro Arg Ala His Arg Arg Pro Gln Ala Pro Ala
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Gln Gln Asp Leu Gln Gly Thr Ser Gln Pro Arg Pro His Arg Arg Pro
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His Arg Arg Pro Gln Ala Pro Ala Arg Gln Asp Leu Gln Gly Thr Ser
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Gln Pro Arg Ala His Arg Arg Pro Gln Ala Pro Ala Arg Gln Asp Leu
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Gln Gly Thr Ser Gln Pro Arg Ala His Arg Arg Pro Gln Ala Pro Ala
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Ser Cys Arg Thr Gln Arg Trp Ser Leu Leu Pro Ser Leu Gly Ser Leu
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Val Leu Gln Ala Leu Tyr Phe Cys Arg Pro Phe Arg Glu Asn Val Leu
    50                  55                  60
Ala Tyr Lys Ala Gln Gln Lys Lys Lys Glu Asn Leu Leu Thr Cys Leu
65                  70                  75                  80
Ala Asp Leu Phe His Ser Ile Ala Thr Gln Lys Lys Lys Val Gly Val
                85                  90                  95
Ile Pro Pro Lys Lys Phe Ile Ser Arg Leu Arg Lys Glu Asn Asp Leu
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Phe Asp Asn Tyr Met Gln Gln Asp Ala His Glu Phe Leu Asn Tyr Leu
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Glu Asp Phe Leu Asp Leu Ser Val Asp Val Glu Gln Asn Thr Ser Ile
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Arg Met Arg Val Lys Lys Leu Pro Met Ile Leu Ala Leu His Leu Lys
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Arg Val Val Phe Pro Leu Glu Leu Arg Leu Phe Asn Thr Ser Ser Asp
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His Gly Phe Trp Leu Leu Phe Asp Asp Asp Ile Val Glu Lys Ile Asp
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<210> 10
<211> 1168
<212> PRT

<213> homo sapiens

<400> 10

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            20                  25                  30
Val Cys Gly Ile Asp Glu Asp His Asp Ile Val Val Gln Tyr Pro Ser
        35                  40                  45
Gly Asn Arg Trp Thr Phe Asn Pro Ala Val Leu Thr Lys Ala Asn Ile
    50                  55                  60
Val Arg Ser Gly Asp Ala Ala Gln Gly Ala Glu Gly Gly Thr Ser Gln
65                  70                  75                  80
Phe Gln Val Gly Asp Leu Val Gln Val Cys Tyr Asp Leu Glu Arg Ile
                85                  90                  95
Lys Leu Leu Gln Arg Gly His Gly Glu Trp Ala Glu Ala Met Leu Pro
            100                 105                 110
Thr Leu Gly Lys Val Gly Arg Val Gln Gln Ile Tyr Ser Asp Ser Asp
        115                 120                 125
Leu Lys Val Glu Val Cys Gly Thr Ser Trp Thr Tyr Asn Pro Ala Ala
    130                 135                 140
Val Ser Lys Val Ala Ser Ala Gly Ser Ala Ile Ser Asn Ala Ser Gly
145                 150                 155                 160
Glu Arg Leu Ser Gln Leu Leu Lys Lys Leu Phe Glu Thr Gln Glu Ser
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Gly Asp Leu Asn Glu Glu Leu Val Lys Ala Ala Ala Asn Gly Asp Val
            180                 185                 190
Ala Lys Val Glu Asp Leu Leu Lys Arg Pro Asp Val Asp Val Asn Gly
        195                 200                 205
Gln Cys Ala Gly His Thr Ala Met Gln Ala Ala Ser Gln Asn Gly His
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Val Asp Ile Leu Lys Leu Leu Leu Lys Gln Asn Val Asp Val Glu Ala
225                 230                 235                 240
Glu Asp Lys Asp Gly Asp Arg Ala Val His His Ala Ala Phe Gly Asp
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Glu Gly Ala Val Ile Glu Val Leu His Arg Gly Ser Ala Asp Leu Asn
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Ala Arg Asn Lys Arg Arg Gln Thr Pro Leu His Ile Ala Val Asn Lys
        275                 280                 285
Gly His Leu Gln Val Val Lys Thr Leu Leu Asp Phe Gly Cys His Pro
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Ser Leu Gln Asp Ser Glu Gly Asp Thr Pro Leu His Asp Ala Ile Ser
305                 310                 315                 320
Lys Lys Arg Asp Asp Ile Leu Ala Val Leu Leu Glu Ala Gly Ala Asp
                325                 330                 335
Val Thr Ile Thr Asn Asn Asn Gly Phe Asn Ala Leu His His Ala Ala
            340                 345                 350
Leu Arg Gly Asn Pro Ser Ala Met Arg Val Leu Leu Ser Lys Leu Pro
        355                 360                 365
Arg Pro Trp Ile Val Asp Glu Lys Lys Asp Asp Gly Tyr Thr Ala Leu
    370                 375                 380
His Leu Ala Ala Leu Asn Asn His Val Glu Val Ala Glu Leu Leu Val
385                 390                 395                 400
His Gln Gly Asn Ala Asn Leu Asp Ile Gln Asn Val Asn Gln Gln Thr
                405                 410                 415
Ala Leu His Leu Ala Val Glu Arg Gln His Thr Gln Ile Val Arg Leu
            420                 425                 430
Leu Val Arg Ala Gly Ala Lys Leu Asp Ile Gln Asp Lys Asp Gly Asp
        435                 440                 445
Thr Pro Leu His Glu Ala Leu Arg His His Thr Leu Ser Gln Leu Arg
    450                 455                 460
Gln Leu Gln Asp Met Gln Asp Val Gly Lys Val Asp Ala Ala Trp Glu
465                 470                 475                 480
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Pro Ser Lys Asn Thr Leu Ile Met Gly Leu Gly Thr Gln Gly Ala Glu
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Lys Lys Ser Ala Ala Ser Ile Ala Cys Phe Leu Ala Ala Asn Gly Ala
            500                 505                 510
Asp Leu Ser Ile Arg Asn Lys Lys Gly Gln Ser Pro Leu Asp Leu Cys
        515                 520                 525
Pro Asp Pro Asn Leu Cys Lys Ala Leu Ala Lys Cys His Lys Glu Lys
    530                 535                 540
Val Ser Gly Gln Val Gly Ser Arg Ser Pro Ser Met Ile Ser Asn Asp
545                 550                 555                 560
Ser Glu Thr Leu Glu Glu Cys Met Val Cys Ser Asp Met Lys Arg Asp
                565                 570                 575
Thr Leu Phe Gly Pro Cys Gly His Ile Ala Thr Cys Ser Leu Cys Ser
            580                 585                 590
Pro Arg Val Lys Lys Cys Leu Ile Cys Lys Glu Gln Val Gln Ser Arg
        595                 600                 605
Thr Lys Ile Glu Glu Cys Val Val Cys Ser Asp Lys Lys Ala Ala Val
    610                 615                 620
Leu Phe Gln Pro Cys Gly His Met Cys Ala Cys Glu Asn Cys Ala Asn
625                 630                 635                 640
Leu Met Lys Lys Cys Val Gln Cys Arg Ala Val Val Glu Arg Arg Val
                645                 650                 655
Pro Phe Ile Met Cys Cys Gly Gly Lys Ser Ser Glu Asp Ala Thr Asp
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Asp Ile Ser Ser Gly Asn Ile Pro Val Leu Gln Lys Asp Lys Asp Asn
        675                 680                 685
Thr Asn Val Asn Ala Asp Val Gln Lys Leu Gln Gln Gln Leu Gln Asp
    690                 695                 700
Ile Lys Glu Gln Thr Met Cys Pro Val Cys Leu Asp Arg Leu Lys Asn
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Met Ile Phe Leu Cys Gly His Gly Thr Cys Gln Leu Cys Gly Asp Arg
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Met Ser Glu Cys Pro Ile Cys Arg Lys Ala Ile Glu Arg Arg Ile Leu
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Leu Tyr Glx Leu Arg His Met Val Tyr Phe Val Ser Glx Cys Ile Glx
        755                 760                 765
Ser Glx Asp Leu Asn Arg Leu Leu Ile Glx Leu Glu Val Leu Met Ser
    770                 775                 780
Glx Phe Leu Ile Ser Glx Phe Leu Tyr Glx Ser Ile Ile Gly Leu Glx
785                 790                 795                 800
Met Tyr Gln Asn Lys Lys Pro Tyr Lys Met Val Leu Glu Ile Val Phe
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Phe Val Phe Val Leu Asn Leu Lys His Gln Ile His Val Thr His Arg
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Ile Ile Tyr Leu Trp Leu Leu Arg Gly Lys Ser Phe Lys Asp Ile Leu
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Phe Glx Lys Ile Ala Phe Phe Ser Tyr Asn Leu Glx Ile Cys Trp Ile
    850                 855                 860
Ser Lys Asp Ile Ile Leu Cys Asp Gln Leu Ser Phe Ile Ser Ser Trp
865                 870                 875                 880
Phe Tyr Thr Val Ser Glx Glx Gln Val Leu Glx Glu Val Met His Gln
                885                 890                 895
Ile Lys Glu Ala Gly Gln Thr Ile Met Ser His Gly Lys Leu Glx Asn
            900                 905                 910
Asp Ser Thr Ser Ser Arg Glx Leu Arg Glu Tyr Arg Arg Asp Asp Ser
        915                 920                 925
Phe Phe Lys Ile Thr Gly Ser Tyr Pro His Val Cys Phe Glx Ile Leu
    930                 935                 940
Arg Val Asn Gly Ser Ile Glu Glx Gly Asn Asn Asp Phe Ala Phe Leu
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Leu Phe Ser Arg Phe Lys Arg Asn Ile Val Glx Leu Glu Ser Asp Tyr
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Gln Phe Gln Gly Asp Glx Glx Thr Arg Lys Gly Lys Ile Ser Asn Asn
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Ser Gly Gln Leu Lys Arg Lys Lys Lys Arg Val Ser Ile Asn Trp Pro
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Leu Thr Val Ala Phe Leu Thr Leu Ile Tyr Thr Leu Phe Cys Ser Ala
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Ser Val Phe Lys Lys Asn Leu Glx Lys Val Tyr Phe Arg Phe Ser Val
1025                1030                1035                1040
Ile Thr Tyr Leu Gly Leu Ile Glx Pro Val Lys Glx His Cys Pro Ile
                1045                1050                1055
Trp Thr Ser Glu Val Leu Phe Ser Phe Ala Asp Val His Ser Ile Pro
            1060                1065                1070
Val Ile Cys Lys Ile Asn Ala Phe Ser Lys Lys Lys Ser Phe Leu Leu
        1075                1080                1085
Cys Ile Ser Glx Phe Glx Gln Cys Glx Glx Phe Cys Leu His Tyr Arg
    1090                1095                1100
Pro Tyr Phe His Tyr Leu Phe Leu Tyr Ser Ile Phe Cys Tyr Lys Glu
1105                1110                1115                1120
Asn Ser Leu Ser Val Tyr Thr Tyr Gly Glx Gly Tyr Tyr Leu Asn Cys
                1125                1130                1135
Gln Gln Tyr Pro Arg His Gly Gln Glx Pro Asn Tyr Lys Tyr Phe Arg
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Lys Ser Asp Gln Asp Met Tyr Arg Asn Val Cys Leu Pro Val Asp Phe
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<210> 11
<211> 1246
<212> DNA
<213> homo sapiens

<400> 11

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<210> 12
<211> 309
<212> PRT
<213> homo sapiens

<400> 12

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            20                  25                  30
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Arg Ser Leu Gly Ser Pro Val Leu Gly Leu Asp Thr Cys Arg Ala Trp
        35                  40                  45
Asp His Val Asp Gly Gln Ile Leu Gly Gln Leu Arg Pro Leu Thr Glu
    50                  55                  60
Glu Glu Glu Glu Glu Gly Ala Gly Ala Thr Leu Ser Arg Gly Pro Ala
65                  70                  75                  80
Phe Pro Gly Met Gly Ser Glu Glu Leu Arg Leu Ala Ser Phe Tyr Asp
                85                  90                  95
Trp Pro Leu Thr Ala Glu Val Pro Pro Glu Leu Leu Ala Ala Ala Gly
            100                 105                 110
Phe Phe His Thr Gly His Gln Asp Lys Val Arg Cys Phe Phe Cys Tyr
        115                 120                 125
Gly Gly Leu Gln Ser Trp Lys Arg Gly Asp Asp Pro Trp Thr Glu His
    130                 135                 140
Ala Lys Trp Phe Pro Ser Cys Gln Phe Leu Leu Arg Ser Lys Gly Arg
145                 150                 155                 160
Asp Phe Val His Ser Val Gln Glu Thr His Ser Gln Leu Leu Gly Ser
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Trp Asp Pro Trp Glu Glu Pro Glu Asp Ala Ala Pro Val Ala Pro Ser
            180                 185                 190
Val Pro Ala Ser Gly Tyr Pro Glu Leu Pro Thr Pro Arg Arg Glu Val
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Gln Ser Glu Ser Ala Gln Glu Pro Gly Ala Arg Asp Val Glu Ala Gln
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225                 230                 235                 240
Ala Val Ser Ile Val Phe Val Pro Cys Gly His Leu Val Cys Ala Glu
                245                 250                 255
Cys Ala Pro Gly Leu Gln Leu Cys Pro Ile Cys Arg Ala Pro Val Arg
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Ser Arg Val Arg Thr Phe Leu Ser Glx Ala Arg Cys His Gly Arg Pro
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<211> 3478
<212> DNA
<213> homo sapiens

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305                 310                 315                 320
Lys Glu Ser Lys Lys Arg Lys Leu Glu Leu Ser Arg Arg Glu Gln Pro
                325                 330                 335
Pro Thr Glu Pro Gly Pro Gln Ser Ala Ser Glu Val Glu Lys Ile Ala
            340                 345                 350
Leu Asn Leu Glu Gly Cys Ala Leu Ser Gln Gly Ser Leu Arg Thr Gly
        355                 360                 365
Thr Gln Glu Val Gly Gly Gln Asp Pro Gly Glu Ala Val Gln Pro Cys
    370                 375                 380
Arg Gln Pro Leu Gly Ala Arg Val Ala Asp Lys Val Arg Lys Arg Arg
385                 390                 395                 400
Lys Val Asp Glu Gly Ala Gly Asp Ser Ala Ala Val Ala Ser Gly Gly
                405                 410                 415
Ala Gln Thr Leu Ala Leu Ala Gly Ser Pro Ala Pro Ser Gly His Pro
            420                 425                 430
Lys Ala Gly His Ser Glu Asn Gly Val Glu Glu Asp Thr Glu Gly Arg
        435                 440                 445
Thr Gly Pro Lys Glu Gly Thr Pro Gly Ser Pro Ser Glu Thr Pro Gly
    450                 455                 460
Pro Arg Pro Ala Gly Pro Ala Gly Asp Glu Pro Ala Glu Ser Pro Ser
465                 470                 475                 480
Glu Thr Pro Gly Pro Ser Pro Ala Gly Pro Thr Arg Asp Glu Pro Ala
                485                 490                 495
Glu Ser Pro Ser Glu Thr Pro Gly Pro Arg Pro Ala Gly Pro Ala Gly
            500                 505                 510
Asp Glu Pro Ala Glu Ser Pro Ser Glu Thr Pro Gly Pro Arg Pro Ala
        515                 520                 525
Gly Pro Ala Gly Asp Glu Pro Ala Glu Ser Pro Ser Glu Thr Pro Gly
    530                 535                 540
Pro Ser Pro Ala Gly Pro Thr Arg Asp Glu Pro Ala Lys Ala Gly Glu
545                 550                 555                 560
Ala Ala Glu Leu Gln Asp Ala Glu Val Glu Ser Ser Ala Lys Ser Gly
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Lys Pro
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<210> 19

<211> 176
<212> PRT
<213> homo sapiens

<400> 19
Met Arg Val Leu Gly Thr Val Leu Arg Trp Pro Val Val Val Pro Arg
 1   5   10   15
Pro Trp Pro Leu Pro Gly Pro Leu Pro His Arg Gly Thr Pro Arg Leu
            20   25   30
Asp Thr Val Arg Thr Gly Leu Arg Arg Thr Gln Lys Val Glu Arg Gly
        35   40   45
Pro Lys Lys Val Pro Leu Gly Ala His Arg Arg Pro Gln Ala Pro Ala
    50   55   60
Gln Gln Asp Leu Gln Gly Thr Ser Gln Pro Arg Ala His Arg Arg Pro
65   70   75   80
Gln Ala Pro Ala Arg Gln Asp Leu Gln Gly Met Ser Gln Pro Arg Ala
                85   90   95
His Arg Arg Pro Gln Ala Pro Ala Arg Gln Asp Leu Gln Gly Thr Ser
            100   105   110
Gln Pro Arg Ala His Arg Arg Pro Gln Ala Pro Ala Arg Gln Asp Leu
        115   120   125
Gln Gly Thr Ser Gln Pro Arg Ala His Arg Arg Pro Gln Ala Pro Ala
    130   135   140
Arg Gln Asp Leu Gln Gly Met Ser Gln Pro Arg Arg Gly Arg Gln Gln
145   150   155   160
Ser Cys Arg Thr Gln Arg Trp Ser Leu Leu Pro Ser Leu Gly Ser Leu
                165   170   175

<210> 20
<211> 49
<212> PRT
<213> homo sapiens

<400> 20
Ser Pro Ser Glu Thr Pro Gly Pro Arg Pro Ala Gly Pro Ala Gly Asp
 1   5   10   15
Glu Pro Ala Glu Ser Pro Ser Glu Thr Pro Gly Pro Arg Pro Ala Gly
            20   25   30
Pro Ala Gly Asp Glu Pro Ala Lys Thr Pro Ser Glu Thr Pro Gly Pro
        35   40   45
Ser

<210> 21
<211> 50
<212> PRT
<213> homo sapiens

<400> 21
Ala His Arg Arg Pro Gln Ala Pro Ala Gln Gln Asp Leu Gln Gly Thr
 1   5   10   15
Ser Gln Pro Arg Ala His Arg Arg Pro Gln Ala Pro Ala Gln Gln Asp
            20   25   30
Leu Gln Gly Thr Ser Gln Pro Arg Ala His Arg Arg Pro Gln Ala Pro
        35   40   45
Ala Gln
    50

<210> 22
<211> 9

<212> PRT
<213> homo sapiens

<400> 22
Ser Leu Gly Ser Pro Val Leu Gly Leu
 1   5

<210> 23
<211> 10
<212> PRT
<213> homo sapiens

<400> 23
Arg Leu Ala Ser Phe Tyr Asp Trp Pro Leu
 1   5   10

<210> 24
<211> 20
<212> PRT
<213> homo sapiens

<220>
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<222> (2)...(17)
<223> Xaa at 2 is Thr or Met;
      Xaa at 4 is Gln or Arg;
      Xaa at 7 is Ala or Pro;
      Xaa at 16 is Arg or Gln.

<221> VARIANT
<222> 2, 4, 7, 16
<223> Xaa = Any Amino Acid

<400> 24
Gly Xaa Ser Xaa Pro Arg Xaa His Arg Arg Pro Gln Ala Pro Ala Xaa
 1   5   10   15
Gln Asp Leu Gln
            20

<210> 25
<211> 14
<212> PRT
<213> homo sapiens

<400> 25
Ala His Arg Arg Pro Gln Ala Pro Ala Gln Gln Asp Leu Gln
 1   5   10

<210> 26
<211> 20
<212> PRT
<213> homo sapiens

<400> 26
Gly Thr Ser Gln Pro Arg Ala His Arg Arg Pro Gln Ala Pro Ala Arg
 1   5   10   15
Gln Asp Leu Gln
            20

<210> 27
<211> 20
<212> PRT
<213> homo sapiens

<400> 27
Gly Met Ser Gln Pro Arg Ala His Arg Arg Pro Gln Ala Pro Ala Arg
 1   5   10   15
Gln Asp Leu Gln
            20

<210> 28
<211> 20
<212> PRT
<213> homo sapiens

<400> 28
Gly Thr Ser Gln Pro Arg Ala His Arg Arg Pro Gln Ala Pro Ala Gln
 1   5   10   15
Gln Asp Leu Gln
            20

<210> 29
<211> 20
<212> PRT
<213> homo sapiens

<400> 29
Gly Thr Ser Gln Pro Arg Pro His Arg Arg Pro Gln Ala Pro Ala Arg
 1   5   10   15
Gln Asp Leu Gln
            20

<210> 30
<211> 20
<212> PRT
<213> homo sapiens

<220>
<221> VARIANT
<222> (1)...(20)
<223> Xaa at 9 is Arg or Ser;
      Xaa at 14 is Ala or Thr;
      Xaa at 15 is Gly or Arg;
      Xaa at 20 is Glu or Lys

<221> VARIANT
<222> 9, 14, 15, 20
<223> Xaa = Any Amino Acid

<400> 30
Ser Pro Ser Glu Thr Pro Gly Pro Xaa Pro Ala Gly Pro Xaa Xaa Asp
 1   5   10   15
Glu Pro Ala Xaa
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<210> 31
<211> 20
<212> PRT
<213> homo sapiens

<400> 31
Ser Pro Ser Glu Thr Pro Gly Pro Arg Pro Ala Gly Pro Ala Gly Asp
 1   5   10   15
Glu Pro Ala Glu
            20

<210> 32
<211> 20
<212> PRT
<213> homo sapiens

<400> 32
Ser Pro Ser Glu Thr Pro Gly Pro Ser Pro Ala Gly Pro Thr Arg Asp
 1   5   10   15
Glu Pro Ala Glu
            20

<210> 33
<211> 20
<212> PRT
<213> homo sapiens

<400> 33
Ser Pro Ser Glu Thr Pro Gly Pro Ser Pro Ala Gly Pro Thr Arg Asp
 1   5   10   15
Glu Pro Ala Lys
            20

<210> 34
<211> 6670
<212> DNA
<213> homo sapiens

<400> 34
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<210> 35
<211> 618
<212> PRT
<213> homo sapiens

<400> 35

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            20                  25                  30
Pro Asn Leu Ser Phe Tyr Arg Asn Glu Ile Arg Phe Leu Pro Asn Gly
        35                  40                  45
Cys Phe Ile Glu Asp Ile Leu Gln Asn Trp Thr Asp Asn Tyr Asp Leu
    50                  55                  60
Leu Glu Asp Asn His Ser Tyr Ile Gln Trp Leu Phe Pro Leu Arg Glu
65                  70                  75                  80
Pro Gly Val Asn Trp His Ala Lys Pro Leu Thr Leu Arg Glu Val Glu
                85                  90                  95
Val Phe Lys Ser Ser Gln Glu Ile Gln Glu Arg Leu Val Arg Ala Tyr
            100                 105                 110
Ala Ala His Ala Gly Leu Leu Arg Asp Pro Ala Gly Gly Pro Arg His
        115                 120                 125
Gly His Gly Gly Pro Ser Thr Glu Leu Pro Glu Ala Leu Pro Glu Pro
    130                 135                 140
Glu Leu Arg Ser His Asn Asn Leu Arg Ile Thr Arg Ile Leu Lys Ser
145                 150                 155                 160
Leu Gly Glu Leu Gly Leu Glu His Phe Gln Ala Pro Leu Val Arg Phe
                165                 170                 175
Phe Leu Glu Glu Ser Leu Val Arg Arg Glu Leu Pro Gly Val Arg Gln
            180                 185                 190
Ser Ala Leu Asp Tyr Phe Met Phe Ala Val Gly Cys Arg His Gln Arg
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        195                 200                 205
Arg Gln Leu Val His Phe Ala Trp Glu His Phe Arg Pro Arg Cys Lys
    210                 215                 220
Phe Val Trp Gly Pro Gln Asp Lys Leu Arg Arg Phe Lys Pro Ser Ser
225                 230                 235                 240
Leu Pro His Pro Leu Glu Gly Ser Arg Lys Val Glu Glu Glu Gly Ser
                245                 250                 255
Pro Gly Asp Pro Asp His Glu Ala Ser Thr Gln Gly Arg Thr Cys Gly
            260                 265                 270
Pro Glu His Ser Lys Gly Gly Gly Arg Val Asp Glu Gly Pro Gln Pro
        275                 280                 285
Arg Ser Val Glu Pro Gln Asp Ala Gly Pro Leu Glu Arg Ser Gln Gly
    290                 295                 300
Asp Glu Ala Gly Gly His Gly Glu Asp Arg Pro Glu Pro Leu Ser Pro
305                 310                 315                 320
Lys Glu Ser Lys Lys Arg Lys Leu Glu Leu Ser Arg Arg Glu Gln Pro
                325                 330                 335
Pro Thr Glu Pro Gly Pro Gln Ser Ala Ser Glu Val Glu Lys Ile Ala
            340                 345                 350
Leu Asn Leu Glu Gly Cys Ala Leu Ser Gln Gly Ser Leu Arg Thr Gly
        355                 360                 365
Thr Gln Glu Val Gly Gly Gln Asp Pro Gly Glu Ala Val Gln Pro Cys
    370                 375                 380
Arg Gln Pro Leu Gly Ala Arg Val Ala Asp Lys Val Arg Lys Arg Arg
385                 390                 395                 400
Lys Val Asp Glu Gly Ala Gly Asp Ser Ala Ala Val Ala Ser Gly Gly
                405                 410                 415
Ala Gln Thr Leu Ala Leu Ala Gly Ser Pro Ala Pro Ser Gly His Pro
            420                 425                 430
Lys Ala Gly His Ser Glu Asn Gly Val Glu Glu Asp Thr Glu Gly Arg
        435                 440                 445
Thr Gly Pro Lys Glu Gly Thr Pro Gly Ser Pro Ser Glu Thr Pro Gly
    450                 455                 460
Pro Ser Pro Ala Gly Pro Ala Gly Asp Glu Pro Ala Glu Ser Pro Ser
465                 470                 475                 480
Glu Thr Pro Gly Pro Arg Pro Ala Gly Pro Ala Gly Asp Glu Pro Ala
                485                 490                 495
Glu Ser Pro Ser Glu Thr Pro Gly Pro Arg Pro Ala Gly Pro Ala Gly
            500                 505                 510
Asp Glu Pro Ala Lys Thr Pro Ser Glu Thr Pro Gly Pro Ser Pro Ala
        515                 520                 525
Gly Pro Thr Arg Asp Glu Pro Ala Glu Ser Pro Ser Glu Thr Pro Gly
    530                 535                 540
Pro Arg Pro Ala Gly Pro Ala Gly Asp Glu Pro Ala Glu Ser Pro Ser
545                 550                 555                 560
Glu Thr Pro Gly Pro Arg Pro Ala Gly Pro Ala Gly Asp Glu Pro Ala
                565                 570                 575
Glu Ser Pro Ser Glu Thr Pro Gly Pro Ser Pro Ala Gly Pro Thr Arg
            580                 585                 590
Asp Glu Pro Ala Lys Ala Gly Glu Ala Ala Glu Leu Gln Asp Ala Glu
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Val Glu Ser Ser Ala Lys Ser Gly Lys Pro
    610                 615
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<210> 36
<211> 355
<212> DNA
<213> homo sapiens

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gctgggtggg gaagacacag ccaggccagg aggcttctgc aggccttggc tatccctgag 180
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<210> 37
<211> 270
<212> DNA
<213> homo sapiens

<400> 37
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<210> 38
<211> 141
<212> DNA
<213> homo sapiens

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ctgggtgggg aagacacagc c 141

<210> 39
<211> 192
<212> DNA
<213> homo sapiens

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<210> 40
<211> 309
<212> DNA
<213> homo sapiens

<220>
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<223> n = A,T,C or G

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<211> 178
<212> DNA
<213> homo sapiens

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<210> 42
<211> 166
<212> DNA
<213> homo sapiens

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<223> n = A,T,C or G

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<210> 43
<211> 209
<212> DNA
<213> homo sapiens

<220>
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<223> n = A,T,C or G

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<211> 241
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<213> homo sapiens

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<210> 46
<211> 1299
<212> PRT
<213> homo sapiens

<400> 46

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Asp Lys Arg Phe Arg Leu Trp Tyr Val Gly Gly Ser Cys Leu Asp His
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Arg Thr Thr Leu Pro Met Leu Pro Trp Leu Met Ala Glu Ile Arg Arg
    50                  55                  60
Arg Ser Gln Lys Pro Glu Ala Gly Gly Cys Gly Ala Pro Ala Ala Arg
65                  70                  75                  80
Glu Val Ile Leu Val Leu Ser Ala Pro Phe Leu Arg Cys Val Pro Ala
                85                  90                  95
Pro Gly Ala Gly Ala Ser Gly Gly Thr Ser Pro Ser Ala Thr Gln Pro
            100                 105                 110
Asn Pro Ala Val Phe Ile Phe Glu His Lys Ala Gln His Ile Ser Arg
        115                 120                 125
Phe Ile His Asn Ser His Asp Leu Thr Tyr Phe Ala Tyr Leu Ile Lys
    130                 135                 140
Ala Gln Pro Asp Asp Pro Glu Ser Gln Met Ala Cys His Val Phe Arg
145                 150                 155                 160
Ala Thr Asp Pro Ser Gln Val Pro Asp Val Ile Ser Ser Ile Arg Gln
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Leu Ser Lys Ala Ala Met Lys Glu Asp Ala Lys Pro Ser Lys Asp Asn
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Glu Asp Ala Phe Tyr Asn Ser Gln Lys Phe Glu Val Leu Tyr Cys Gly
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Lys Val Thr Val Thr His Lys Lys Ala Pro Ser Ser Leu Ile Asp Asp
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Cys Met Glu Lys Phe Ser Leu His Glu Gln Gln Arg Leu Lys Ile Gln
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275 280 285
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290 295 300
Gly Phe Asp Glu Gln Gln Glu Phe Arg Ser Arg Cys Ser Ser Val Thr
305 310 315 320
Gly Val Gln Arg Arg Val His Glu Gly Ser Gln Lys Ser Gln Pro Arg
325 330 335
Arg Arg His Ala Ser Ala Pro Ser His Val Gln Pro Ser Asp Ser Glu
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Lys Asn Arg Thr Met Leu Phe Gln Val Gly Arg Phe Glu Ile Asn Leu
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370 375 380
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385 390 395 400
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Val Phe Gln Cys Ala Ser Glu Ser Leu Val Asp Glu Val Met Leu Thr
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Cys Glu Arg Ile Glu Gly Leu Tyr Pro Pro Arg Ala Lys Leu Val Ile
465 470 475 480
Gln Arg His Leu Ser Ser Leu Thr Asp Asn Glu Gln Ala Asp Ile Phe
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Glu Arg Val Gln Lys Met Lys Pro Val Ser Asp Gln Glu Glu Asn Glu
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Thr Phe Pro Glu Glu Asp Ser Asp Ser Pro Gln Phe Arg Arg Arg Ala
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His Thr Phe Ser His Pro Pro Ser Ser Thr Lys Arg Lys Leu Asn Leu
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690 695 700
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Cys Ser Asn Glu Ser Leu Ser Val Gly Gly Thr Ser Val Thr Pro Arg
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785                 790                 795                 800
Glu Leu Leu Pro Leu Ser Pro Leu Ser Pro Thr Met Glu Glu Glu Pro
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Arg Lys Lys Ser Lys Glu Leu Arg Ser Leu Trp Arg Lys Ala Ile His
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Gln Gln Ile Leu Leu Leu Arg Met Glu Lys Glu Asn Gln Lys Leu Glu
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Gly Ala Ser Arg Asp Glu Leu Gln Ser Arg Lys Val Lys Leu Asp Tyr
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<210> 47
<211> 2020
<212> DNA
<213> homo sapiens

<400> 47

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tcagagcaac agacatccct gagactgttc tccctgacac tgtgagagtg tgctgggacc 1980
ttcagctaaa tgtgagggtg ggccctaata agtacaagtg                      2020
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<210> 48
<211> 600
<212> PRT
<213> homo sapiens

<400> 48

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Met Ser Val Ser Leu Val Val Ile Arg Leu Glu Leu Ala Glu His Ser
 1               5                  10                  15
Pro Val Pro Ala Gly Phe Gly Phe Ser Ala Ala Ala Gly Glu Met Ser
            20                  25                  30
Asp Glu Glu Ile Lys Lys Thr Thr Leu Ala Ser Ala Val Ala Cys Leu
```

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        35                  40                  45
Glu Gly Lys Ser Pro Gly Glu Lys Val Ala Ile Ile His Gln His Leu
    50                  55                  60
Gly Arg Arg Glu Met Thr Asp Val Ile Ile Glu Thr Met Lys Ser Asn
65                  70                  75                  80
Pro Asp Glu Leu Lys Thr Thr Val Glu Glu Arg Lys Ser Ser Glu Ala
                85                  90                  95
Ser Pro Thr Ala Gln Arg Ser Lys Asp His Ser Lys Glu Cys Ile Asn
            100                 105                 110
Ala Ala Pro Asp Ser Pro Ser Lys Gln Leu Pro Asp Gln Ile Ser Phe
        115                 120                 125
Phe Ser Gly Asn Pro Ser Val Glu Ile Val His Gly Ile Met His Leu
    130                 135                 140
Tyr Lys Thr Asn Lys Met Thr Ser Leu Lys Glu Asp Val Arg Arg Ser
145                 150                 155                 160
Ala Met Leu Cys Ile Leu Thr Val Pro Ala Ala Met Thr Ser His Asp
                165                 170                 175
Leu Met Lys Phe Val Ala Pro Phe Asn Asp Val Ile Glu Gln Met Lys
            180                 185                 190
Ile Ile Arg Asp Ser Thr Pro Asn Gln Tyr Met Val Leu Ile Lys Phe
        195                 200                 205
Arg Ala Gln Ala Asp Ala Asp Ser Phe Tyr Met Thr Cys Asn Gly Arg
    210                 215                 220
Gln Phe Asn Ser Ile Glu Asp Asp Val Cys Gln Leu Val Tyr Val Glu
225                 230                 235                 240
Arg Ala Glu Val Leu Lys Ser Glu Asp Gly Ala Ser Leu Pro Val Met
                245                 250                 255
Asp Leu Thr Glu Leu Pro Lys Cys Thr Val Cys Leu Glu Arg Met Asp
            260                 265                 270
Glu Ser Val Asn Gly Ile Leu Thr Thr Leu Cys Asn His Ser Phe His
        275                 280                 285
Ser Gln Cys Leu Gln Arg Trp Asp Asp Thr Thr Cys Pro Val Cys Arg
    290                 295                 300
Tyr Cys Gln Thr Pro Glu Pro Val Glu Glu Asn Lys Cys Phe Glu Cys
305                 310                 315                 320
Gly Val Gln Glu Asn Leu Trp Ile Cys Leu Ile Cys Gly His Ile Gly
                325                 330                 335
Cys Gly Arg Tyr Val Ser Arg His Ala Tyr Lys His Phe Glu Glu Thr
            340                 345                 350
Gln His Thr Tyr Ala Met Gln Leu Thr Asn His Arg Val Trp Asp Tyr
        355                 360                 365
Ala Gly Asp Asn Tyr Val His Arg Leu Val Ala Ser Lys Thr Asp Gly
    370                 375                 380
Lys Ile Val Gln Tyr Glu Cys Glu Gly Asp Thr Cys Gln Glu Glu Lys
385                 390                 395                 400
Ile Asp Ala Leu Gln Leu Glu Tyr Ser Tyr Leu Leu Thr Ser Gln Leu
                405                 410                 415
Glu Ser Gln Arg Ile Tyr Trp Glu Asn Lys Ile Val Arg Ile Glu Lys
            420                 425                 430
Asp Thr Ala Glu Glu Ile Asn Asn Met Lys Thr Lys Phe Lys Glu Thr
        435                 440                 445
Ile Glu Lys Cys Asp Asn Leu Glu His Lys Leu Asn Asp Leu Leu Lys
    450                 455                 460
Glu Lys Gln Ser Val Glu Arg Lys Cys Thr Gln Leu Asn Thr Lys Val
465                 470                 475                 480
Ala Lys Leu Thr Asn Glu Leu Lys Glu Glu Gln Glu Met Asn Lys Cys
                485                 490                 495
Leu Arg Ala Asn Gln Val Leu Leu Gln Asn Lys Leu Lys Glu Glu Glu
            500                 505                 510
Arg Val Leu Lys Glu Thr Cys Asp Gln Lys Asp Leu Gln Ile Thr Glu
        515                 520                 525
Ile Gln Glu Gln Leu Arg Asp Val Met Phe Tyr Leu Glu Thr Gln Gln
    530                 535                 540
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Lys Ile Asn His Leu Pro Ala Glu Thr Arg Gln Lys Ser Arg Arg Asp
545                 550                 555                 560
Arg Ser Thr Ser Pro Trp Pro Arg Pro Arg Ala Leu Pro Leu Arg Gly
                565                 570                 575
Ala Val Gly Ser Cys Pro Pro Gly Arg Ala Ala Ala Arg Gly Ala Ser
            580                 585                 590
Asp Leu Gln Ser Asn Arg His Pro
        595                 600


<210> 49
<211> 226
<212> DNA
<213> homo sapiens

<220>
<221> misc_feature
<222> 163, 168
<223> n = A,T,C or G

<400> 49
ctgggatact cccctcccag ggtgtctggt ggcaggcctg tgcctatccc tgctgtcccc 60
agggtgggcc ccgggggtca ggagctccag aagggccagc tgggcatatt ctgagattgg 120
ccatcagccc ccatttctgc tgcaaacctg gtcagagcca gtnttccntc catgggacct 180
aaagacagtg ccaagtgcct gcaccgtgga ccacagccga gccact                226

<210> 50
<211> 441
<212> DNA
<213> homo sapiens

<400> 50
gaaaaaaaaa acgagtatct attaactggc cactaacagt tgcctttctt acattaattt 60
atacactatt ttgttcagcc agtgttttta aaaaaaatct atgaaaagtg tacttccggt 120
tttctgtgat tacttatctg ggcttgatct gaccagtgaa atgacattgc cctatttgga 180
cctctgaggt tctatttagc tttgcagatg tacatagtat cccagtgatc tgcaaaatta 240
atgccttttc caagaaaaaa tcttttcttc tctgtatcag ttaattctga cagtgttagt 300
gattctgtct tcattatagg ccttatttcc attatctctt tctttatagt atttttgtt 360
ataaagaaaa cagtctttct gtgtatacct acggatgagg gtattattta aactgccaac 420
aatatccaag acatggtcaa t                                          441

<210> 51
<211> 393
<212> DNA
<213> homo sapiens

<400> 51
aagtctacag gtaagcagac atttctatac atgtcctggt cactctttct aaagtattta 60
taattaggtt attgaccatg tcttggatat tgttggcagt ttaaataata ccctcatccg 120
taggtataca cagaaagact gttttcttta taacaaaaaa tactataaag aaagagataa 180
tggaaataag gcctataatg aagacagaat cactaacact gtcagaatta actgatacag 240
agaagaaaag atttttttctt ggaaaaggca ttaattttgc agatcactgg gatactatgt 300
acatctgcaa agctaaatag aacctcagag gtccaaatag ggcaatgtca tttcactggt 360
cagatcaagc ccagataagt aatcacagaa aac                             393

<210> 52
<211> 427
<212> DNA
<213> homo sapiens

<400> 52
ttttttttg tctatcagtc accttgaaac tggtaatctg attcaagtta aacaatgttc 60
cttttgaatc tagaaaacaa gagaaatgca aagtcattat tccctcattc tatgcttcca 120
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tttactctaa gaattcagaa acaaacatgt gggtaacttc ctgttatctt aaaaaaagaa 180
tcatcccttc ggtattccct taactatctg gaacttgtac tgtcatttta taatttacca 240
tgtgacataa ttgtttgacc tgcctctttt atttgatgca tgacttctca gagaacctgt 300
tatcaactca ctgtgtaaaa ccacgatgaa atgaaggata actgatcaca aagaattatg 360
tcttttgata tccaacaaat ttacaaatta taagagaaaa atgcaatttt ttaaaaaagg 420
atatcct 427

<210> 53
<211> 417
<212> DNA
<213> homo sapiens

<400> 53
aaaaacactg gctgaacaaa atagtgtata aattaatgta agaaaggcaa ctgttagtgg 60
ccagttaata gatactcgtt tttttttttc tcttcagttg cccactatta ttgcttattt 120
ttccttttct tgtctatcag tcaccttgaa actggtaatc tgattcaagt taaacaatgt 180
tccttttgaa tctagaaaac aagagaaatg caaagtcatt attccctcat tctatgcttc 240
catttactct aagaattcag aaacaaacat gtgggtaact tcctgttatc ttaaaaaaag 300
aatcatccct tcggtattcc cttaactatc tggaacttgt actgtcattt tataatttac 360
catgtgacat aattgtttga cctgcctctt ttatttgatg catgacttct cagagaa 417

<210> 54
<211> 362
<212> DNA
<213> homo sapiens

<400> 54
ctcttcagtt gcccactatt attgcttatt tttccttttc ttgtctatca gtcaccttga 60
aactggtaat ctgattcaag ttaaacaatg ttccttttga atctagaaaa caagagaaat 120
gcaaagtcat tattccctca ttctatgctt ccatttactc taagaattca gaaacaaaca 180
tgtgggtaac ttcctgttat cttaaaaaaa gaatcatccc ttcggtattc ccttaactat 240
ctggaacttg tactgtcatt ttataattta ccatgtgaca taattgtttg acctgcctct 300
tttatttgat gcatgacttc tcagagaacc tgttatcaac tcactgtgta aaaccacgat 360
ga 362

<210> 55
<211> 236
<212> DNA
<213> homo sapiens

<400> 55
tttttctctt cagttgcccg ctattattgc ttatttttcc ttttcttgtc tatcagtcac 60
cttgaaactg gtaatctgat tcaagttaaa caatgttcct tttgaatcta gaaaacaaga 120
gaaatgcaaa gtcattattc cctcattcta tgcttccatt tactctaaga attcagaaac 180
aaacatgtgg gtaacttcct gttatcttaa aaaaagaatc atcccttcgg tcgacg 236

<210> 56
<211> 368
<212> DNA
<213> homo sapiens

<400> 56
agaaacagtc tttctgtgta tacctacgga tgagggtatt atttaaactg ccaacaatat 60
ccaagacatg gtcaataacc taattataaa tactttagaa agagtgacca ggacatgtat 120
agaaatgtct gcttacctgt agactttaaa aacaaacaaa aaaaacaaac aaaatttttg 180
gagcatttaa tcatttttttt tctcctttta tctcctttgt aatcttattg tctcctgagt 240
aaatatacac ataaatgttt ggggattcat tgctgctaga ttatatcagg tgtttacata 300
gtgtctacta tatgctgttg ataagctttt tcctaaaaat agttatcctc ttttgtagtg 360
tttttccc 368

<210> 57
<211> 153
<212> DNA

<213> homo sapiens

<400> 57
ttttttttg tctatcagtc accttgaaac tggtaatctg attcaagtta aacaatgttc 60
cttttgaatc tagaaaacaa gagaaatgca aagtcattat tccctcattc tatgcttcca 120
tttactctaa gaattcagaa acaaacatgt ggg 153

<210> 58
<211> 324
<212> DNA
<213> homo sapiens

<400> 58
agaaaacagt ctttctgygt atacctacgg atsagggtat tatttaaact gccamcaata 60
tccaagvcat ggtcaataac ctaadcataa mtactttaga aagagtgacc aggccatgta 120
tagaaatgtc tgcttactgt agactttaaa aacaaacaaa aaaacaaaca aatthttgga 180
gcatttaatc attthttttc tccttttatc tcctthtgta atcttattgt ctcctgagta 240
aatatacaca taaatstttk gggattcatt gctgbhagat tatatcaggt gtttacatag 300
tgtctactat atgctgttga taag 324

<210> 59
<211> 416
<212> DNA
<213> homo sapiens

<400> 59
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ctagaaaaca agagaaatgc aaagtcatta ttccctcatt ctatgcttcc atttactcta 120
agaattcaga aacaaacatg tgggtaactt cctgttatct taaaaaaaga atcatccctt 180
cggtattccc ttaactatct ggaacttgta ctgtcatttt ataatttacc atgtgacata 240
attgtttgac ctgcctcttt tatttgatgc atgacttctc agagaacctg ttatcaactc 300
actgtgtaaa accacgatga aatgaaggat aactgatcac aaagaattat gtcttttgag 360
atccaacaaa tttacaaatt ataagagaaa aatgcaattt tttaaaaaag gatatc 416

<210> 60
<211> 2489
<212> DNA
<213> homo sapiens

<400> 60
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gagccaggga gggagccgct ggagcggaag cccggaggcc gcgctgcgcc ggggtgaggt 120
ggctttgacc ccgggttgcc cggccagcac gaccgaggag gtggctggac agctggagga 180
tgaacggaga agccgactgc cccacagacc tggaaatggc cgcccccaaa ggccaagacc 240
gttggtccca ggaagacatg ctgactttgc tggaatgcat gaagaacaac cttccatcca 300
atgacagctc caagttcaaa accaccgaat cacacatgga ctgggaaaaa gtagcattta 360
aagacttttc tggagacatg tgcaagctca aatgggtgga gatttctaat gaggtgagga 420
agttccgtac attgacagaa ttgatcctcg atgctcagga acatgttaaa aatccttaca 480
aaggcaaaaa actcaagaaa cacccagact tcccaaagaa gcccctgacc ccttatttcc 540
gcttcttcat ggagaagcgg gccaagtatg cgaaactcca ccctgagatg agcaacctgg 600
acctaaccaa gattctgtcc aagaaataca aggagcttcc ggagaagaag aagatgaaat 660
atattcagga cttccagaga gagaaacagg agttcgagcg aaacctggcc cgattcaggg 720
aggatcaccc cgacctaatc cagaatgcca agaaatcgga catcccagag aagcccaaaa 780
ccccccagca gctgtggtac acccacgaga agaaggtgta tctcaaagtg cggccagatg 840
agatcatgag agactatatc cagaagcacc cagagctgaa catcagtgag gagggtatca 900
ccaagtccac cctcaccaag gccgaacgcc agctcaagga caagtttgac gggcgaccca 960
ccaagccacc tccgaacagc tactcgctgt actgcgcaga gctcatggcc aacatgaagg 1020
acgtgcccag cacagagcgc atggtgctgt gcagccagca gtggaagctg ctgtcccaga 1080
aggagaagga cgcctatcac aagaagtgtg atcagaaaaa gaaagattac gaggtggagc 1140
tgctccgttt cctcgagagc ctgcctgagg aggagcagca gcgggtcttg ggggaagaga 1200
agatgctgaa catcaacaag aagcaggcca ccagccccgc ctccaagaag ccagcccagg 1260
aaggggggcaa gggcggctcc gagaagccca agcggcccgt gtcggccatg ttcatcttct 1320
cggaggagaa acggcggcag ctgcaggagg agcggcctga gctctccgag agcgagctga 1380

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cccgcctgct ggcccgaatg tggaacgacc tgtctgagaa gaagaaggcc aagtacaagg 1440
cccgagaggc ggcgctcaag gctcagtcgg agaggaagcc cggcggggag cgcgaggaac 1500
ggggcaagct gcccgagtcc cccaaaagag ctgaggagat ctggcaacag agcgttatcg 1560
gcgactacct ggcccgcttc aagaatgacc gggtgaaggc cttgaaagcc atggaaatga 1620
cctggaataa catggaaaag aaggagaaac tgatgtggat taagaaggca gccgaagacc 1680
aaaagcgata tgagagagag ctgagtgaga tgcgggcacc tccagctgct acaaattctt 1740
ccaagaagat gaaattccag ggagaaccca agaagcctcc catgaacggt taccagaagt 1800
tctcccagga gctgctgtcc aatggggagc tgaaccacct gccgctgaag gagcgcatgg 1860
tggagatcgg cagtcgctgg cagcgcatct cccagagcca gaaggagcac tacaaaaagc 1920
tggccgagga gcagcaaaag cagtacaagg tgcacctgga cctctgggtt aagagcctgt 1980
ctccccagga ccgtgcagca tataaagagt acatctccaa taaacgtaag agcatgacca 2040
agctgcgagg cccaaacccc aaatccagcc ggactactct gcagtccaag tcggagtccg 2100
aggaggatga tgaagaggat gaggatgacg aggacgagga tgaagaagag gaagatgatg 2160
agaatgggga ctcctctgaa gatggcggcg actcctctga gtccagcagc gaggacgaga 2220
gcgaggatgg ggatgagaat gaagaggatg acgaggacga agacgacgac gaggatgacg 2280
atgaggatga agataatgag tccgagggca gcagctccag ctcctcctcc tcaggggact 2340
cctcagactc tgactccaac tgaggctcag ccccacccca gggcagccag ggagagccca 2400
ggagctcccc tccccaactg accacctttg tttctccccc atgttctgtc ccttgccccc 2460
ctggcctccc ccactttctt tctttcttt                                   2489

<210> 61
<211> 727
<212> PRT
<213> homo sapiens

<400> 61
Met Asn Gly Glu Ala Asp Cys Pro Thr Asp Leu Glu Met Ala Ala Pro
 1               5                  10                  15
Lys Gly Gln Asp Arg Trp Ser Gln Glu Asp Met Leu Thr Leu Leu Glu
            20                  25                  30
Cys Met Lys Asn Asn Leu Pro Ser Asn Asp Ser Ser Lys Phe Lys Thr
        35                  40                  45
Thr Glu Ser His Met Asp Trp Glu Lys Val Ala Phe Lys Asp Phe Ser
    50                  55                  60
Gly Asp Met Cys Lys Leu Lys Trp Val Glu Ile Ser Asn Glu Val Arg
65                  70                  75                  80
Lys Phe Arg Thr Leu Thr Glu Leu Ile Leu Asp Ala Gln Glu His Val
                85                  90                  95
Lys Asn Pro Tyr Lys Gly Lys Lys Leu Lys Lys His Pro Asp Phe Pro
            100                 105                 110
Lys Lys Pro Leu Thr Pro Tyr Phe Arg Phe Phe Met Glu Lys Arg Ala
        115                 120                 125
Lys Tyr Ala Lys Leu His Pro Glu Met Ser Asn Leu Asp Leu Thr Lys
    130                 135                 140
Ile Leu Ser Lys Lys Tyr Lys Glu Leu Pro Glu Lys Lys Lys Met Lys
145                 150                 155                 160
Tyr Ile Gln Asp Phe Gln Arg Glu Lys Gln Glu Phe Glu Arg Asn Leu
                165                 170                 175
Ala Arg Phe Arg Glu Asp His Pro Asp Leu Ile Gln Asn Ala Lys Lys
            180                 185                 190
Ser Asp Ile Pro Glu Lys Pro Lys Thr Pro Gln Gln Leu Trp Tyr Thr
        195                 200                 205
His Glu Lys Lys Val Tyr Leu Lys Val Arg Pro Asp Glu Ile Met Arg
    210                 215                 220
Asp Tyr Ile Gln Lys His Pro Glu Leu Asn Ile Ser Glu Glu Gly Ile
225                 230                 235                 240
Thr Lys Ser Thr Leu Thr Lys Ala Glu Arg Gln Leu Lys Asp Lys Phe
                245                 250                 255
Asp Gly Arg Pro Thr Lys Pro Pro Pro Asn Ser Tyr Ser Leu Tyr Cys
            260                 265                 270
Ala Glu Leu Met Ala Asn Met Lys Asp Val Pro Ser Thr Glu Arg Met
        275                 280                 285
Val Leu Cys Ser Gln Gln Trp Lys Leu Leu Ser Gln Lys Glu Lys Asp
```

```
    290                 295                 300
Ala Tyr His Lys Lys Cys Asp Gln Lys Lys Lys Asp Tyr Glu Val Glu
305                 310                 315                 320
Leu Leu Arg Phe Leu Glu Ser Leu Pro Glu Glu Glu Gln Gln Arg Val
                325                 330                 335
Leu Gly Glu Glu Lys Met Leu Asn Ile Asn Lys Lys Gln Ala Thr Ser
            340                 345                 350
Pro Ala Ser Lys Lys Pro Ala Gln Glu Gly Gly Lys Gly Gly Ser Glu
        355                 360                 365
Lys Pro Lys Arg Pro Val Ser Ala Met Phe Ile Phe Ser Glu Glu Lys
    370                 375                 380
Arg Arg Gln Leu Gln Glu Glu Arg Pro Glu Leu Ser Glu Ser Glu Leu
385                 390                 395                 400
Thr Arg Leu Leu Ala Arg Met Trp Asn Asp Leu Ser Glu Lys Lys Lys
                405                 410                 415
Ala Lys Tyr Lys Ala Arg Glu Ala Ala Leu Lys Ala Gln Ser Glu Arg
            420                 425                 430
Lys Pro Gly Gly Glu Arg Glu Glu Arg Gly Lys Leu Pro Glu Ser Pro
        435                 440                 445
Lys Arg Ala Glu Glu Ile Trp Gln Gln Ser Val Ile Gly Asp Tyr Leu
    450                 455                 460
Ala Arg Phe Lys Asn Asp Arg Val Lys Ala Leu Lys Ala Met Glu Met
465                 470                 475                 480
Thr Trp Asn Asn Met Glu Lys Lys Glu Lys Leu Met Trp Ile Lys Lys
                485                 490                 495
Ala Ala Glu Asp Gln Lys Arg Tyr Glu Arg Glu Leu Ser Glu Met Arg
            500                 505                 510
Ala Pro Pro Ala Ala Thr Asn Ser Ser Lys Lys Met Lys Phe Gln Gly
        515                 520                 525
Glu Pro Lys Lys Pro Pro Met Asn Gly Tyr Gln Lys Phe Ser Gln Glu
    530                 535                 540
Leu Leu Ser Asn Gly Glu Leu Asn His Leu Pro Leu Lys Glu Arg Met
545                 550                 555                 560
Val Glu Ile Gly Ser Arg Trp Gln Arg Ile Ser Gln Ser Gln Lys Glu
                565                 570                 575
His Tyr Lys Lys Leu Ala Glu Glu Gln Gln Lys Gln Tyr Lys Val His
            580                 585                 590
Leu Asp Leu Trp Val Lys Ser Leu Ser Pro Gln Asp Arg Ala Ala Tyr
        595                 600                 605
Lys Glu Tyr Ile Ser Asn Lys Arg Lys Ser Met Thr Lys Leu Arg Gly
    610                 615                 620
Pro Asn Pro Lys Ser Ser Arg Thr Thr Leu Gln Ser Lys Ser Glu Ser
625                 630                 635                 640
Glu Glu Asp Asp Glu Glu Asp Glu Asp Asp Glu Asp Glu Asp Glu Glu
                645                 650                 655
Glu Glu Asp Asp Glu Asn Gly Asp Ser Ser Glu Asp Gly Gly Asp Ser
            660                 665                 670
Ser Glu Ser Ser Ser Glu Asp Glu Ser Glu Asp Gly Asp Glu Asn Glu
        675                 680                 685
Glu Asp Asp Glu Asp Glu Asp Asp Asp Glu Asp Asp Asp Glu Asp Glu
    690                 695                 700
Asp Asn Glu Ser Glu Gly Ser Ser Ser Ser Ser Ser Ser Ser Gly Asp
705                 710                 715                 720
Ser Ser Asp Ser Asp Ser Asn
                725
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<210> 62
<211> 607
<212> DNA
<213> homo sapiens

<220>

<221> misc_feature
<222> 602
<223> n = A,T,C or G

<400> 62
ttttcagcat gagaatatgt gaatatgttt atttaggttt aacttacttc ttactatata 60
gatttggctt gtttttata ataacaactg atatatgatt cacaaaaaag cagagaagag 120
taagagaaag agagagaaat ggagaaagag aagaaaaaag ggataaagaa tgaaagagag 180
aaagagaata ccattctcta aaggaagagg tgcagaaaat tccattatcc tttcttcttg 240
atcatgcctt gtatgattgg cagccaaact agcccactgt gaaacccaac gtttgcttcc 300
agatgaagat gtgccttcct ctgagtggtg aaatccagat gtagtcagtg gttttctttc 360
ttccattact gctgcagcag aactgagagc ccaatctttt attagatctt tatgtttttc 420
gttgataaca ggcctattat aatccgattg tcatctactc caaacacaac agctggtctg 480
atgctttcag tagccggacc tctgtagctt ttgtgttcga atggtggcgt ctaagtgttc 540
ctcaagagtt gcacgtttgc tacagcgccg tgagccccag cgttctctga atcacttgcg 600
tncatca 607

<210> 63
<211> 402
<212> DNA
<213> homo sapiens

<220>
<221> misc_feature
<222> 35
<223> n = A,T,C or G

<400> 63
ggcagagcac agaccaagcc aggagatgga taaangttaa aaaatcaagc aacttctgct 60
acttctgaaa aggataatga tgatgaccaa agtgacaagg gtacttatac cattgagtta 120
gagaatccca acagtgagga agtggaagca agaaaaatga ttcacaaggt aaataattga 180
aatttgagtg tgatcttagt tgttgtgtgg tgtatttgac tggtggaaat tattggagag 240
tcagcatgag atgttgtcat gcagtcagtg gtatgtgaat tttagggttt tattagggaa 300
ctgcaagact aacagtaaga ccaacatgct ttgtgatttt atttgctgat attctgaatt 360
tacctgagtt tcatacataa agctctgtac atttaaaagg tt 402

<210> 64
<211> 607
<212> DNA
<213> homo sapiens

<220>
<221> misc_feature
<222> 602
<223> n = A,T,C or G

<400> 64
ttttcagcat gagaatatgt gaatatgttt atttaggttt aacttacttc ttactatata 60
gatttggctt gtttttata ataacaactg atatatgatt cacaaaaaag cagagaagag 120
taagagaaag agagagaaat ggagaaagag aagaaaaaag ggataaagaa tgaaagagag 180
aaagagaata ccattctcta aaggaagagg tgcagaaaat tccattatcc tttcttcttg 240
atcatgcctt gtatgattgg cagccaaact agcccactgt gaaacccaac gtttgcttcc 300
agatgaagat gtgccttcct ctgagtggtg aaatccagat gtagtcagtg gttttctttc 360
ttccattact gctgcagcag aactgagagc ccaatctttt attagatctt tatgtttttc 420
gttgataaca ggcctattat aatccgattg tcatctactc caaacacaac agctggtctg 480
atgctttcag tagccggacc tctgtagctt ttgtgttcga atggtggcgt ctaagtgttc 540
ctcaagagtt gcacgtttgc tacagcgccg tgagccccag cgttctctga atcacttgcg 600
tncatca 607

<210> 65
<211> 317
<212> DNA
<213> homo sapiens

<220>
<221> misc_feature
<222> 17, 25, 37, 41, 53, 68, 70, 144
<223> n = A,T,C or G

<400> 65
tggggcgtgt gtggaanaac gttantgccc agcggantag nggccccgga gcncgaccgc 60
agcggcanan cgacaacagc ggcgacgacg acgacgacga ggtgggggga ggacggcgtg 120
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Ala Tyr Val Glu Thr Gln Asp Gln Leu Leu Leu Glu Lys Leu Glu Asn
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Ser Gln Gln Ile Arg Val Leu Leu Met Glu Leu Glu Glu Ala Arg Gly
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Ala Ser Lys Arg Tyr Glu Met Leu Gln Asp Asn Val Glu Gly Tyr Arg
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Arg Glu Ile Thr Ser Leu His Glu Arg Asn Gln Lys Leu Thr Ala Thr
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Arg Glu Leu Gln Glu Leu Glu Asp Ser Leu Asn Ala Glu Arg Glu Lys
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Val Gln Val Thr Ala Lys Thr Met Ala Gln His Glu Glu Leu Met Lys
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Lys Thr Glu Thr Met Asn Val Val Met Glu Thr Asn Lys Met Leu Arg
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Leu Arg Glu His Gln Glu Arg His Leu Glu Gln Arg Asp Glu Pro Gln
            1620                1625                1630
Glu Pro Ser Asn Lys Val Pro Glu Gln Gln Arg Gln Ile Thr Leu Lys
        1635                1640                1645
Thr Thr Pro Ala Ser Gly Glu Arg Gly Ile Ala Ser Thr Ser Asp Pro
    1650                1655                1660
Pro Thr Ala Asn Ile Lys Pro Thr Pro Val Val Ser Thr Pro Ser Lys
```

1665 1670 1675 1680
Val Thr Ala Ala Ala Met Ala Gly Asn Lys Ser Thr Pro Arg Ala Ser
1685 1690 1695
Ile Arg Pro Met Val Thr Pro Ala Thr Val Thr Asn Pro Thr Thr Thr
1700 1705 1710
Pro Thr Ala Thr Val Met Pro Thr Thr Gln Val Glu Ser Gln Glu Ala
1715 1720 1725
Met Gln Ser Glu Gly Pro Val Glu His Val Pro Val Phe Gly Ser Thr
1730 1735 1740
Ser Gly Ser Val Arg Ser Thr Ser Pro Asn Val Gln Pro Ser Ile Ser
1745 1750 1755 1760
Gln Pro Ile Leu Thr Val Gln Gln Gln Thr Gln Ala Thr Ala Phe Val
1765 1770 1775
Gln Pro Thr Gln Gln Ser His Pro Gln Ile Glu Pro Ala Asn Gln Glu
1780 1785 1790
Leu Ser Ser Asn Ile Val Glu Val Val Gln Ser Ser Pro Val Glu Arg
1795 1800 1805
Pro Ser Thr Ser Thr Ala Val Phe Gly Thr Val Ser Ala Thr Pro Ser
1810 1815 1820
Ser Ser Leu Pro Lys Arg Thr Arg Glu Glu Glu Glu Asp Ser Thr Ile
1825 1830 1835 1840
Glu Ala Ser Asp Gln Val Ser Asp Asp Thr Val Glu Met Pro Leu Pro
1845 1850 1855
Lys Lys Leu Lys Ser Val Thr Pro Val Gly Thr Glu Glu Glu Val Met
1860 1865 1870
Ala Glu Glu Ser Thr Asp Gly Glu Val Glu Thr Gln Val Tyr Asn Gln
1875 1880 1885
Asp Ser Gln Asp Ser Ile Gly Glu Gly Val Thr Gln Gly Asp Tyr Thr
1890 1895 1900
Pro Met Glu Asp Ser Glu Glu Thr Ser Gln Ser Leu Gln Ile Asp Leu
1905 1910 1915 1920
Gly Pro Leu Gln Ser Asp Gln Gln Thr Thr Thr Ser Ser Gln Asp Gly
1925 1930 1935
Gln Gly Lys Gly Asp Asp Val Ile Val Ile Asp Ser Asp Asp Glu Glu
1940 1945 1950
Glu Asp Glu Glu Asp Asp Asp Asp Asp Glu Asp Asp Thr Gly Met Gly
1955 1960 1965
Asp Glu Gly Glu Asp Ser Asn Glu Gly Thr Gly Ser Ala Asp Gly Asn
1970 1975 1980
Asp Gly Tyr Glu Ala Asp Asp Ala Glu Gly Gly Asp Gly Thr Asp Pro
1985 1990 1995 2000
Gly Thr Glu Thr Glu Glu Ser Met Gly Gly Gly Glu Gly Asn His Arg
2005 2010 2015
Ala Ala Asp Ser Gln Asn Ser Gly Glu Gly Asn Thr Gly Ala Ala Glu
2020 2025 2030
Ser Ser Phe Ser Gln Glu Val Ser Arg Glu Gln Gln Pro Ser Ser Ala
2035 2040 2045
Ser Glu Arg Gln Ala Pro Arg Ala Pro Gln Ser Pro Arg Arg Pro Pro
2050 2055 2060
His Pro Leu Pro Pro Arg Leu Thr Ile His Ala Pro Pro Gln Glu Leu
2065 2070 2075 2080
Gly Pro Pro Val Gln Arg Ile Gln Met Thr Arg Arg Gln Ser Val Gly
2085 2090 2095
Arg Gly Leu Gln Leu Thr Pro Gly Ile Gly Gly Met Gln Gln His Phe
2100 2105 2110
Phe Asp Asp Glu Asp Arg Thr Val Pro Ser Thr Pro Thr Leu Val Val
2115 2120 2125
Pro His Arg Thr Asp Gly Phe Ala Glu Ala Ile His Ser Pro Gln Val
2130 2135 2140
Ala Gly Val Pro Arg Phe Arg Phe Gly Pro Pro Glu Asp Met Pro Gln
2145 2150 2155 2160
Thr Ser Ser Ser His Ser Asp Leu Gly Gln Leu Ala Ser Gln Gly Gly
2165 2170 2175

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Leu Gly Met Tyr Glu Thr Pro Leu Phe Leu Ala His Glu Glu Glu Ser
            2180                2185                2190
Gly Gly Arg Ser Val Pro Thr Thr Pro Leu Gln Val Ala Ala Pro Val
        2195                2200                2205
Thr Val Phe Thr Glu Ser Thr Thr Ser Asp Ala Ser Glu His Ala Ser
    2210                2215                2220
Gln Ser Val Pro Met Val Thr Thr Ser Thr Gly Thr Leu Ser Thr Thr
2225                2230                2235                2240
Asn Glu Thr Ala Thr Gly Asp Asp Gly Asp Glu Val Phe Val Glu Ala
                2245                2250                2255
Glu Ser Glu Gly Ile Ser Ser Glu Ala Gly Leu Glu Ile Asp Ser Gln
            2260                2265                2270
Gln Glu Glu Glu Pro Val Gln Ala Ser Asp Glu Ser Asp Leu Pro Ser
        2275                2280                2285
Thr Ser Gln Asp Pro Pro Ser Ser Ser Ser Val Asp Thr Ser Ser Ser
    2290                2295                2300
Gln Pro Lys Pro Phe Arg Arg Val Arg Leu Gln Thr Thr Leu Arg Gln
2305                2310                2315                2320
Gly Val Arg Gly Arg Gln Phe Asn Arg Gln Arg Gly Val Ser His Ala
                2325                2330                2335
Met Gly Gly Arg Gly Gly Ile Asn Arg Gly Asn Ile Asn
            2340                2345
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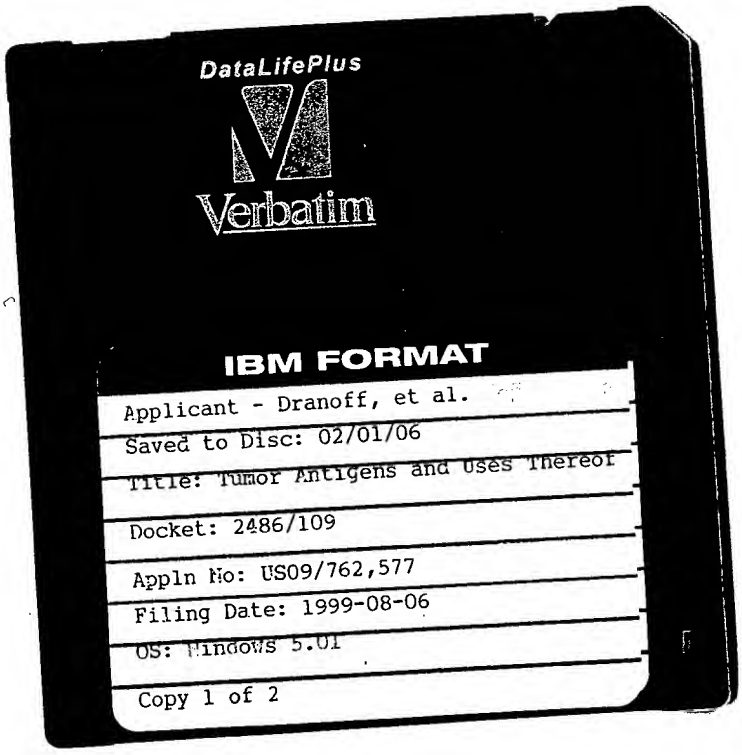
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